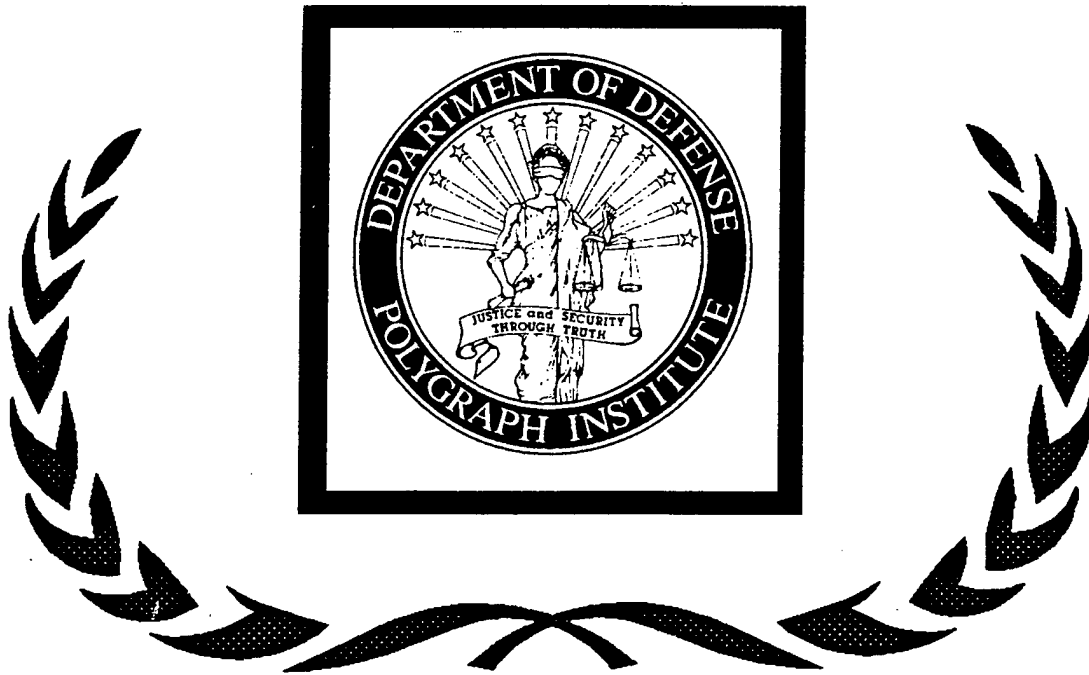


REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE November 1996		3. REPORT TYPE AND DATES COVERED Final Report (Feb 95 - Nov 96)
4. TITLE AND SUBTITLE Effectiveness of Detection of Deception Examinations using the Computer Voice Stress Analyzer			5. FUNDING NUMBERS DoDPI95-P-0016	
6. AUTHOR(S) Michael J. Janniro and Victor L. Cestaro				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Department of Defense Polygraph Institute Building 3195 Fort McClellan, AL 36205-5114			8. PERFORMING ORGANIZATION REPORT NUMBER DoDPI96-R-0005	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Department of Defense Polygraph Institute Building 3195 Fort McClellan, AL 36205-5114			19. SPONSORING / MONITORING AGENCY REPORT NUMBER DoDPI96-R-0005 DoDPI95-P-0016	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Public release, distribution unlimited.			12b. DISTRIBUTION CODE 19961223 010	
13. ABSTRACT (Maximum 200 words) The accuracy of the Computer Voice Stress Analyzer (CVSA) instrument and associated processes for the detection of deception was assessed using a mock theft scenario. One hundred nine subjects were randomly assigned to two groups and given detection of deception examinations using a CVSA instrument. Subjects in one group were programmed deceptive and participated in taking \$100 from a metal box located in a scenario room. The non-deceptive group did not participate in the scenarios nor did they have knowledge of the mock theft. Four trained and certified CVSA examiners conducted the examinations using a CVSA technique called the Modified Zone of Comparison test. Test chart evaluators, who had not taken part in the study and who were blind to subject programming, obtained an overall accuracy of 49.8% ($z = -.05$, $p = .96$). Administering examiners correctly identified 53 of 109 (48.6%) subjects as either deceptive or non-deceptive ($z = -.21$, $p = .84$). More deceptive subjects were correctly identified by examiners than non-deceptive subjects (32 of 55 vs. 21 of 54). However, decisions were not significantly different from chance in either case.				
14. SUBJECT TERMS accuracy, computer voice stress analyzer, voice stress analysis detection of deception			15. NUMBER OF PAGES 25	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT	



Effectiveness of Detection of Deception Examinations
Using the Computer Voice Stress Analyzer

Michael J. Janniro, Ph.D. and Victor L. Cestaro, Ph.D.

November 1996

Department of Defense Polygraph Institute
Fort McClellan, Alabama 36205-5114
Telephone: 205-848-3803
FAX: 205-848-5332

Report No. DoDPI96-R-0005

Effectiveness of Detection of Deception Examinations
Using the Computer Voice Stress Analyzer

Michael J. Janniro, Ph.D. and Victor L. Cestaro, Ph.D.

November 1996

Department of Defense Polygraph Institute
Fort McClellan, Alabama 36205

Director's Foreword

It has long been proposed that changes in human voice characteristics are indicative of deception. The current study is the third in a series of studies completed at the Department of Defense Polygraph Institute to test the latest in a line of instruments and procedures purported to identify deceptive responses through the analysis of verbal responses.

Essentially, the question is whether or not the Computer Voice Stress Analyzer (CVSA) and associated procedures can accurately categorize truthful and deceptive examinees. To answer the question, the authors designed a mock larceny paradigm, and provided it to authorities in the CVSA field for their comments and approval. After receiving approval, the authors acquired the services of four expert examiners identified and selected by proponents of the CVSA. These CVSA experts then conducted and analyzed all tests included in this report.

The results of the study are clear and unambiguous. Police chiefs and attorneys should consider these results and their ramifications when deciding what methods of detection of deception they will employ.

A handwritten signature in black ink, appearing to read "Michael H. Capps", with a stylized, flowing script.

Michael H. Capps
Director

Acknowledgments

The authors wish to express sincere gratitude to Detective Gary Noel, Detective Robert Neubauer, Investigator Terry Kilgore, and Investigator Bernie Erwin, all assigned to different police departments in the state of Florida for serving as the examiners in this study. Their competence, dependability, and willingness to learn more about detection of deception is commendable.

Special appreciation goes to Special Agent Bob Tippet, Florida Department of Law Enforcement, for his technical advice on the Computer Voice Stress Analyzer (CVSA) and associated processes. SA Tippet was kind enough to take time to share his instructional knowledge of CVSA by thoroughly reviewing the protocol for this study.

Also, special thanks to Brenda Smith for her invaluable assistance in preparing for this study, and organizing and guiding a team of research assistants. The authors also want to thank the following research assistants for making this study seem effortless: Charlene Stephens, Kathy Harris, Linda Landy, Joan Harrison-Woodard, and Sarah Tidwell.

This project was funded by the Department of Defense Polygraph Institute as DoDPI95-P-0016. The views expressed in this article are those of the authors and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

Abstract

JANNIRO, M. J., and CESTARO, V. L. Effectiveness of detection of deception examinations using the computer voice stress analyzer. November 1996, Report No. DoDPI96-R-0005. Department of Defense Polygraph Institute, Ft. McClellan, AL 36205.--The accuracy of the Computer Voice Stress Analyzer (CVSA) instrument and associated processes for the detection of deception was assessed using a mock theft scenario. One hundred nine subjects were randomly assigned to two groups and given detection of deception examinations using a CVSA instrument. Subjects in one group were programmed deceptive and participated in taking \$100 from a metal box located in a scenario room. The non-deceptive group did not participate in the scenarios nor did they have knowledge of the mock theft. Four trained and certified CVSA examiners conducted the examinations using a CVSA technique called the Modified Zone of Comparison test. Test chart evaluators, who had not taken part in the study and who were blind to subject programming, obtained an overall accuracy of 49.8% ($z = -.05$, $p = .96$). Administering examiners correctly identified 53 of the 109 (48.6%) subjects as either deceptive or non-deceptive ($z = -.21$, $p = .84$). More deceptive subjects were correctly identified by examiners than non-deceptive subjects (32 of 55 vs. 21 of 54). However, decisions were not significantly different from chance in either case.

Key-words: accuracy, computer voice stress analyzer, voice stress analysis, detection of deception

Table of Contents

Title Page	i
Director's Foreword	ii
Acknowledgments	iii
Abstract.....	iv
Introduction.....	1
Method	2
Subjects.....	2
Apparatus	2
Examiners	2
Procedures.....	2
Scoring	3
Data analysis	3
Results	4
Discussion.....	4
References	6
Appendix A: Description of Research	A-1
Appendix B: Volunteer Agreement Affidavit.....	B-1
Appendix C: Pre-Test Questionnaire.....	C-1
Appendix D: Scenario	D-1
Appendix E: Instructions for Deceptive Examinee	E-1
Appendix F: Instructions for Non-deceptive Examinee.....	F-1
Appendix G: CVSA Pre-Test Interview	G-1
Appendix H: CVSA Relevant Test Questions (MZOC)	H-1
Appendix I: Participant Debriefing Statement.....	I-1

Scientific detection of deception originated in Europe before the turn of the century. Cesare Lombroso, an Italian criminologist, was the first to report using a device to measure blood pressure and pulse rate changes as indicators of deception (Abrams, 1989). This was the first attempt to determine truth or deception by examination of a physiological response. Soon afterwards, additional research showed that the respiratory system and the electrodermal response could also serve as indicators of truth and deception (see Barland, 1988).

In 1936, an instrument called the polygraph was developed which made it possible to simultaneously monitor each of these physiological response systems (Trovillo, 1939). Since then, the polygraph instrument has been generally accepted as the standard tool for determining truth and deception (U.S. Congress, Office of Technology Assessment, 1983). Today the term psychophysiological detection of deception (PDD) and its processes and procedures (Podlesny & Raskin, 1977; Yankee, 1995) are used to define the dated terms of "polygraph," "polygraph science," and "polygraph examination."

In 1971, Dektor Counterintelligence and Security, Inc., (Savannah, Georgia), developed a device for detecting stress, which they called the Psychological Stress Evaluator (PSE). The National Institute for Truth Verification (NITV) Certified Examiners Course Manual (1995) states that the PSE detects subaudible microtremors in the human voice, and that analysis of these stress related tremors has great utility for the detection of deception. Soon afterwards, advertisements in popular magazines, newspapers, and trade journals began comparing the accuracy and utility of the polygraph instrument to voice stress analyzers (see NITV, 1990; NITV, 1994; NITV, 1995). Claims have been made in newspaper articles that the CVSA is easier to use and more accurate than the polygraph instrument (see NITV, 1990, p. 18).

The PSE has recently been supplanted by an instrument called the Computer Voice Stress Analyzer (CVSA) manufactured by the NITV. Although the theoretical physiological basis of monitoring subaudible microtremors is unchanged from the PSE, instrument design changes and ease of use are making the CVSA a popular tool. Periodic publications of the NITV's Journal of Continuing Education (e.g., 1990) include several newspaper articles pronouncing the CVSA's effectiveness and acceptance by many police departments. Most testimonials cited in NITV's journals, regarding the efficacy of the CVSA, stress its utility in obtaining admissions and confessions. However, the manufacturer does not provide evidence of controlled laboratory studies that would support the high accuracy rates (97-100%) routinely claimed (G. Barland, personal communication, June 12, 1989; NITV training registration form). Furthermore, no explanations are provided for how these accuracy rates are determined.

The effectiveness of PDD, using the polygraph instrument, has been the subject of a number of controlled scientific studies over the years (Ansley & Garwood, 1984; U.S. Congress, Office of Technology Assessment, 1983). According to Horvath (1982), many well-controlled laboratory studies and field studies support PDD and its associated procedures and processes. Horvath argues that even the most severe critics agree that the findings show an accuracy that justifies the use of PDD testing under certain conditions. However, the

CVSA and its testing procedures and processes have not been subjected to the same rigorous scientific evaluation as the polygraph and its procedures. In 1993, the Inspector General of the Florida Department of Law Enforcement (FDLE, Tallahassee, FL) released a position paper recommending that FDLE prohibit the use of voice stress analysis as an investigative tool because of the lack of scientific evidence supporting its validity. Their position on prohibiting the use of CVSA remains unchanged, according to Ms. Jennifer Brown of the FDLE Inspector General office (M. Janniro, personal communication, Oct 7, 1996). Since the CVSA records physiological data from a response system (the voice) that the current polygraph instrument is incapable of recording, it is possible that the combination of instruments and processes (polygraph and the CVSA) could increase the accuracy and reliability of the detection of deception. The purpose of this study was to evaluate the CVSA and its associated procedures to determine its efficacy in detecting deception.

Method

Subjects

One hundred nine subjects were recruited from a local contract agency and randomly assigned to deceptive and non-deceptive groups. Volunteers were male and female, literate, between the ages of 19 and 65 years, and had a minimum of a high school diploma or GED. Each subject was determined to be in good health and slept at least 6 hours the evening before testing.

Apparatus

Four Computer Voice Stress Analyzers (National Institute for Truth Verification, W. Palm Beach, FL) were used to record and display voice response data on paper charts. Lapel microphones (Radio Shack, Fort Worth, TX, Model 33-3003) were used for supplying subjects' verbal responses to the input jacks of the CVSAs.

Examiners

Four CVSA examiners, trained and certified by NITV, conducted the examinations. The examiners were blind to subject programming. The CVSA tests were also independently blind-scored by three trained and certified CVSA examiners, hereinafter referred to as evaluators.

Procedures

Upon arrival at the Department of Defense Polygraph Institute (DoDPI) testing site, each participant was escorted by a research team assistant to the DoDPI library and asked to read a brief description of the research project (Appendix A). Subjects were programmed in groups of four; two groups in the morning and afternoon. Individuals willing to participate in the study were asked to read and sign a volunteer agreement affidavit (Appendix B). A brief biographical/medical questionnaire was completed to ensure that each participant was in good health and not taking medication that could interfere with examination results (Appendix C). Research team assistants then began programming deceptive and non-deceptive subjects according to the scenario instructions (Appendix D). All subjects were then given their appropriate written instructions (Appendices E and F). Random assignments of subjects to groups were made before the actual experiment. Half of the subjects ($n = 55$) were assigned

to the deceptive group and participated in taking \$100 from a metal box located in a scenario room. The remaining half ($n = 54$) did not participate in the scenarios nor did they have knowledge of the mock theft. Deceptive subjects were instructed to proceed to the scenario room and to remove the \$100 bill from an open metal box located on a table in the scenario room. Each deceptive subject was told to hide the \$100 bill on their person. Additionally, they were instructed to lie to the examiner about taking \$100 from the metal box and having the money on their person. Next to the metal box was a 3" x 5" card with each deceptive subject's examiner room assignment. Non-deceptive subjects also entered the scenario room and picked up a 3" x 5" card with their examiner room assignment. However, the metal box containing the \$100 bill was removed before non-deceptive subjects entered the scenario room. They were instructed to answer questions truthfully during the examination (Appendix F).

CVSA examiners conducted the pre-test interview as described in the NITV Certified Examiners Course Manual (1995), using the information shown in Appendix G as a guide, during which they reviewed the test questions with the subject. The relevant questions used were the same for all subjects (Appendix H). The control and irrelevant questions used were developed by each examiner, based on the rules of test question formulation taught in the NITV Certified Examiners Course. The lapel microphone was placed on the subject and the CVSA instrument was calibrated for the subject's voice level. The examination proceeded using the accepted CVSA format for the Modified Zone of Comparison test, and using the relevant questions shown in Appendix H.

The CVSA examiners conducted three examinations. The chart from the first examination was not evaluated in accordance with NITV scoring procedures (NITV Certified Examiners Course Manual). The second and third charts were numerically scored and categorized. All examinations were recorded on video/audio VHS tape for off-line analysis. When the examination was completed, the subject was escorted back to the briefing room for subject debriefing (Appendix I).

Scoring

Before data reduction and analysis, the original examiners independently evaluated each physiological recording. Based on their scoring they were asked to make a diagnosis of either deception indicated (DI) or no deception indicated (NDI). CVSA procedures do not allow for inconclusive determinations. The examiners' scores and decisions were not written on the charts. The decision for each subject was written by each examiner on a scoring sheet maintained by the examiner. All charts were marked only with the date of the examination and subject number. Charts blind-scored by the three evaluators had all subject numbers removed, and were randomly coded.

Data analysis

The dependent measure for accuracy was the number of correct decisions made regarding deception and non-deception. Interrater agreement was determined by comparing the decision made for each subject among the evaluators, irrespective of the accuracy of the decision. Analyses included a 2 x 2 chi-square analyses of programming vs. decision, and a test of the significance of proportions of DI and NDI decisions when compared to chance

expectancy (0.50). An in-house program using common signal detection theory (SDT) procedures was used to assess instrument sensitivity. Scoring reliability (in the form of interrater agreement) was assessed by a multiple rater kappa statistic (Fleiss, 1981).

Results

Evaluators made correct decisions on 163 of 327 charts (109 subjects x 3 evaluators), obtaining an overall accuracy of 49.8%, ($z = -.05$, $p = .96$), with a range of 45.9% to 54.1%. Their accuracy ranged from 54.5% to 63.6% for DI decisions, and 35.2% to 53.7% for NDI decisions. Administering examiners did slightly worse, achieving an overall accuracy of 48.6% ($z = -.21$, $p = .84$), with an accuracy range of 33.3% to 55.6%. Their DI decision accuracy ranged from 38.5% to 66.7%, and their NDI decision accuracy range was 13.3% to 66.7%. No examiner obtained a combined (DI and NDI) accuracy rate significantly different from chance, nor were the results of chi-square analyses significant. Application of SDT to the data showed that overall instrument sensitivity was low. The noise and signal+noise distributions were completely overlapped, with the criterion line (beta) positioned near the means of the overlapped distributions, indicating nearly equal probability for DI or NDI decisions ($d' = 0$, $\beta = 1.01$). Interrater reliability for all decisions rendered by the evaluators was high ($\kappa = .33$, $SE = .055$, $p < .001$). These evaluators obtained a correct unanimous agreement rate of 26%, and a correct majority (2 of 3) agreement rate of 46%.

Discussion

As shown in a previous study (Cestaro, 1996a), the sensitivity of the CVSA is low when used in a low or no-stress situation, such as that encountered during a typical laboratory study. The CVSA manufacturer claims that stress related to deception can be detected reliably by the instrument, and that stressful and non-stressful responses can be differentiated by trained operators. However, in this study, evaluators and administering examiners were not able to distinguish between deception and non-deception at rates better than chance levels of accuracy (50%). Prior to conducting the study, a power analysis of the proportion test for accuracy indicated that with $N = 100$ (50 per group collapsed across programming [guilty, innocent]) and an expected effect size of 0.20, power = .99 ($p = .05$). This means that, under the test conditions used in this study, there is a .99 probability that an effect of .20 greater than chance would have been detected, had one existed.

While every attempt was made to emulate the subject programming procedures reported in other studies, it is possible that the procedures used did not elicit physiologic responses during deception. The NITV suggests that jeopardy is an essential component of the examination, but has not objectively defined jeopardy. While, in our opinion, it is unlikely that the low accuracy rates obtained are due to problems with the mock crime scenario, it is a possibility.

The test procedures incorporated in the study were the same as those used in field examinations, and all seven examiners (administering and evaluating) were trained and

certified by the equipment manufacturer. All examiners had practical field experience in the pre-test, in-test, test analysis, and post-test phases of CVSA examination administration, and the administering examiners were permitted to conduct the examinations as learned in certification training conducted by the NITV. Examinations were monitored by a CVSA instructor from the NITV. The statistically significant decision concurrence rate, as shown by the results of the interrater reliability tests, seems to provide some level of confidence that the scoring methods employed among examiners were consistent. However, from a practical viewpoint, examiners obtained majority decision agreement on less than half of the subjects, and unanimous agreement on about one quarter of the subjects tested. The lack of instrument sensitivity to the measure(s) of interest impacted on the ability of examiners and evaluators to accurately and consistently discriminate between truthful and deceptive responses when assessing subjects' test charts.

In summary, although there is evidence to support the basic electrical theory of operation of the CVSA (Cestaro, 1996b), the instrument failed to function in a manner that would allow examiners to discriminate between truthful and deceptive responses from test subjects. Further research should examine the effects of increased levels of stress on subjects' responses to determine if there is a correlation between stress levels and instrument display characteristics. Although the CVSA instrument is purported to detect stress in human speech, there is still no unambiguous evidence to support that claim.

References

- Ansley, N., & Garwood, M. (1984). The accuracy and utility of polygraph testing. Polygraph, 13, 3-131.
- Abrams, S. (1989). The complete polygraph handbook. Lexington, MA: Lexington Books.
- Barland, G. H. (1988). The polygraph test in the USA and elsewhere. In A. Gale (Ed.), The Polygraph Test; Lies Truth and Science (pp. 73-95). London: Sage Publications.
- Cestaro, V. L. (1996a). A comparison between decision accuracy rates obtained using the polygraph instrument and the computer voice stress analyzer (CVSA) in the absence of jeopardy. Polygraph, 25, 117-127.
- Cestaro, V. L. (1996b). A test of the computer voice stress analyzer (CVSA) theory of operation. Polygraph, 25, 101-116.
- Fleiss, J. L. (1981). Statistical Methods for Rates and Proportions (2nd ed.). New York: John Wiley & Sons.
- Florida Department of Law Enforcement. (1993, October). Review of literature regarding voice stress analysis. A report compiled by the Office of Inspector General FDLE, Tallahassee, FL.
- Horvath, F. (1982). Detecting deception: The problem and reality of voice stress analysis. Journal of Forensic Sciences, 27, 340-351.
- National Institute for Truth Verification. (1990). Journal of Continuing Education (Vol. 10, No.6). West Palm Beach, FL: Author.
- National Institute for Truth Verification. (1994). Journal of Continuing Education (Vol. 12, No.1). West Palm Beach, FL: Author.
- National Institute for Truth Verification. (1995). Journal of Continuing Education (Vol. 12, No.3). West Palm Beach, FL: Author.
- NITV. (1995). Certified Examiners Course Manual. (Available from the National Institute for Truth Verification, West Palm Beach, FL.)
- Podlesny, J. A., & Raskin, D. C. (1977). Physiological measures and detection of deception. Psychological Bulletin, 84, 782-799.
- Trovillo, P. V. (1939). A history of lie detection. Journal of Criminal Law Criminology, Mar-Jun, 1-57.

U.S. Congress, Office of Technology Assessment. (1983). Scientific validity of polygraph testing (OTA-TM-H-15). Washington, DC: U.S. Government Printing Office.

Yankee, W. J. (1995). The current status of research in forensic psychophysiology and its application in the psychophysiological detection of deception. Journal of Forensic Sciences, 40, 63-68.

Appendix A

Description of Research

WELCOME: Welcome to the Department of Defense Polygraph Institute (DoDPI). This may be the first time you have been to the Institute so we would like to provide you with some information concerning your visit today. PLEASE REMEMBER that your participation is entirely voluntary - you are free to leave at any time. If you have any questions, please feel free to ask the individuals assisting you.

Research Title: Effectiveness of Detection of Deception Examinations Using the Computer Voice Stress Analyzer (CVSA).

Principal Investigator: Dr. Michael J. Janniro, DoDPI Instructor.

BACKGROUND/SIGNIFICANCE: Detection of deception is a process believed to determine whether an individual is responding truthfully to a series of questions using some type of lie detection instrument. The process is based on the assumption that an individual who is deceptive (i.e., lying) has a greater response in some body systems than a person who is not. It is also proposed that there are certain characteristics in a person's voice that change when that person is being deceptive. The purpose of this research is to determine how well deception can be detected by voice characteristics using an instrument called a "Computer Voice Stress Analyzer."

YOU SHOULD NOT PARTICIPATE IN THIS STUDY IF YOU:

- 1) Are taking certain prescription medications (Valium, beta-blockers, etc.).
- 2) Have been diagnosed with a respiratory ailment, especially asthma or emphysema.
- 3) Currently suffer from an acute health problem such as a cold, active allergy problem.

PROCEDURES: During this project you will be asked to participate in a research session lasting approximately 2 hours. Before the session begins, you may be asked to participate in a scenario. During the examination session you will be asked details about the scenario. If you participated in the scenario, you are not to answer truthfully about your participation to the examiner during the examination. If you have not participated in the scenario, then you are to answer questions truthfully, since you have nothing to hide from the examiner. Participation in the CVSA processes is relatively simple. The examiner will ask several questions concerning your age, health, and normal daily activities. During the CVSA session, the examiner will attach a small microphone to your shirt with a clip. He will explain the theory of CVSA and review the questions he will ask you during the examination. When the session is over, you will be escorted to another room for debriefing.

DISCOMFORTS: The CVSA examination consists of two or more repetitions of the questions. Since a microphone will be used to record your responses, you should not experience any discomfort. The time that you will be participating in this study is

approximately two hours, however, you may be here for 3 or 4 hours.

VIDEOTAPING: All examinations conducted during this project will be videotaped using wall and ceiling mounted video cameras and commercial videotape recorders. The tapes collected will be maintained until the operational and data analysis portions of the project are complete. At that time the video tapes will be erased and made available for re-use by the research and instruction divisions.

RISKS: There are no known risks involved in this study.

CONFIDENTIALITY OF RECORDS: You will not be asked any personal questions by the examiner, except medically related information necessary for this study. Neither your identity nor any information you reveal during this project will be released to anyone not directly involved in the research. Members of the U.S. Army Surgeon General's Human Subjects Research Review Board may inspect the research records in their capacity as reviewing officials.

YOUR RIGHTS: You have the right to ask any questions about any aspect of your participation in the study. If any problems arise at any time in conjunction with your involvement in the study the person to contact is the Director, DoDPI at (205) 848-3803. Should any question arise concerning study-related injury, and you are military or a full time government employee, you may contact the Commander of the Noble Army Community Hospital, Fort McClellan, Alabama, 36205, telephone number (205) 848-2200. If you are a contracted employee, you should contact the employment agency.

VOLUNTARY PARTICIPATION: Your participation in this study is completely voluntary. **If you would prefer not to participate, do not volunteer for it!** Even if you decide to participate in the study, you may discontinue at any time without penalty or loss of benefits to which you are entitled. Should you decide not to participate, please inform someone on the staff at the Department of Defense Polygraph Institute, or if it occurs during the CVSA examination itself, inform the examiner and you will be released without penalty.

ADDITIONAL COMMENTS: It is VERY IMPORTANT that you do not discuss your experiences in the CVSA examination with your fellow research participants. If that occurs, you will be withdrawn from the study without further benefit.

Appendix B

Volunteer Agreement Affidavit

This form is affected by the Privacy Act of 1974.

1. **AUTHORITY:** 10 USC 3013, 44 USC 3101 and 10 USC 1071-1087 and E.O. 9397.
2. **PRINCIPLE PURPOSE:** To document voluntary participation in the Clinical Investigation and Research Program.
3. **ROUTINE USES:** The SSN and home address will be used for identification and locating purposes. Information derived from the study will be used to document the study, adjudication of claims, and for mandatory record keeping associated with human use in government research. Information may be furnished to Federal agencies.
4. **DISCLOSURE:** Voluntary. Failure to furnish requested information will preclude your voluntary participation in this investigational study.

Name: _____ SSN: _____ Subj# _____

Date of Birth (Mo/Da/Yr): _____ Place of Birth: _____

Home Address: _____

_____ Home Phone Number _____

PERSONAL STATEMENT

I, _____, being at least 19 years old, do hereby volunteer to participate in a research study titled "Effectiveness of Detection of Deception Examinations using the Computer Voice Stress Analyzer" being conducted at the Department of Defense Polygraph Institute (DoDPI), under the direction of Michael J. Janniro, Ph.D.

1. _____ I understand that I am participating in a research study to examine testing procedures that are currently employed in criminal and/or security screening situations where the Computer Voice Stress Analyzer is used. My voice will be analyzed with a Computer Voice Stress Analyzer.

2. To the best of my knowledge,

A. _____ I am not taking any prescription medication that would effect this study.

B. _____ I have no history of dizziness or fainting spells.

C. _____ I have not been diagnosed as having, nor do I believe that I may have any of the following:

- 1) Heart condition.
- 2) Any respiratory ailment, especially asthma or emphysema.

D. _____ I do not now have any acute health problems such as a cold, or an active allergy problem.

3. _____ I am aware that I will be spending approximately three (3) to four (4) hours at the DoDPI on one occasion, and that I may be asked to conceal specific information from a trained voice stress analysis examiner.

4. _____ I understand that as a part of this study I will be participating in a CVSA examination during which I will be asked to sit still for several minutes while my voice is recorded.

5. _____ I understand that there are no known dangers or risks associated with my participation in this study.

6. _____ I understand that I will be videotaped during the examinations and that the videotape will be maintained.

7. _____ I understand that I may terminate my involvement in this study at any time and for any reason, without penalty.

8. _____ I understand that my participation in this project will be terminated if I discuss the details of my participation with anyone except project supervisory personnel. NOTE: Discussion of details with other participants would invalidate the data collection.

9. _____ I understand that I should contact the principal investigator, Dr. Michael J. Janniro, and/or the Director, DoDPI, Dr. William Yankee, tel (205) 848-3803 if I have any concerns or complaints regarding this study.

10. _____ I understand that any questions concerning my rights relating to study-related injury should be directed to Colonel Weisser, MD, Commander of the Noble Army Community Hospital, Fort McClellan, Alabama, 36205, tel (205) 848-2200, if I am military or a full time government employee. If a contracted civilian, I should contact the employment agency.

11. _____ I have been given a thorough explanation of the nature, purpose, methods, and duration of my participation in this research. I have been given the opportunity to ask any questions I have concerning the research and all questions have been answered to my full satisfaction.

Participant Signature

Witness Signature

Date

Date

Appendix C

Pre-Test Questionnaire

Date of completion: _____

Subject# _____

Please carefully complete all of the blanks below:

Name (Please Print): _____ Gender: ()M ()F

Occupation: _____ Age: _____

Hours of sleep last night: _____

Previous CVSA Examination: ()Yes ()No

Have you ingested alcohol, nicotine, or caffeine (including coffee, tea, soft- drinks, and chocolate) within the last 24 hours? ()Yes ()No

If so, what and when? _____

How would you describe your present health and physical well being?

()Excellent ()Good ()Fair ()Poor

Are you presently under a physician's care and are you taking any medication?

()Yes ()No

If so, for what condition? _____

Please identify the type, dosage, and last time any medication was taken:

Are you experiencing any pain or discomfort today?

()None ()Mild ()Moderate ()Severe

Reason for any pain or discomfort
today _____

Appendix D

Scenario

Deceptive

Subjects assigned to the deceptive condition will be programmed individually. The experimenter will inform each programmed deceptive subject that DoDPI is conducting research in the area of detection of deception. The subject will be given written instructions to take \$100 from a metal box, located in a scenario room, and to conceal the money on his/her person. The subject will be instructed to lie about taking the money or possessing it when confronted by the examiner. The subject will also be told that the CVSA examiner will administer a test to see if the examiner can "catch them" lying about the \$100. The subject will be informed that once in the examination room, s/he will deny any knowledge or involvement in taking or possessing the money. The subject will be told to cooperate fully with the examiner and answer all questions. The subject should not admit to taking the \$100 or having it on his/her person. Instructions will make it clear to deceptive subjects that they are not to reveal having the money at any time to the examiner. This is to preclude examiner feedback.

After reading the instructions, the deceptive subject will go to a room where an open metal box containing a \$100 bill will be located. Additionally, the subject will be instructed to leave his/her instruction sheet on the table and to take the 3" x 5" card co-located with the metal box, and to follow instructions written on the 3" x 5" card. The 3" x 5" card will have the examination room assignment. After the examiner releases the subject, the subject will leave the testing room and return to the briefing room where s/he will be met by a research assistant. The research assistant will collect the 3" x 5" card from each subject.

Non-deceptive

Subjects assigned to this non-deceptive condition will be given similar instructions, but **THERE WILL BE NO MONEY BOX IN THE SCENARIO ROOM** when they enter. Non-deceptive subjects will be informed that they will be given a CVSA examination and to answer all questions truthfully, except where instructed otherwise by the examiner.

Special Instructions to Research Assistant

The research assistant will collect the \$100 bill from subjects programmed deceptive.

Appendix E

Instructions for Deceptive Examinee

Today you will be participating in a scenario. The scenario will involve you taking a \$100 bill from a metal box and concealing the money on your person. After you complete instruction #6 (below), an examiner will be asking you to take a CVSA examination. He will be asking you a variety of questions on the test. These questions are not personal. Please be as cooperative as possible and do your best to follow the examiner's instructions. The examiner will also ask you questions about \$100 being taken from a metal box. Simply answer all the questions truthfully, except questions regarding the \$100 bill, and when instructed otherwise by the examiner. All you have to say is that you did not see any metal box with any money in it. **Do not admit to seeing, taking, or having possession of the \$100 bill.** If you admit to taking and having the \$100, the examination will be stopped and you will be dismissed from the study.

Please wait for the research assistant to release you before proceeding.

1. Go from here to E106.
2. On the table in room E106 is an open metal box.
3. Take the \$100 bill from the metal box. Read the name of the person whose picture is on the front of the bill.
4. Hide the \$100 bill somewhere on your person.
5. Take the 3" x 5" card located next to the metal box.
6. Follow the instructions on the card pertaining to examination room assignment.
7. When the examination is over, bring the 3" x 5" card back to the LIBRARY and wait for the research assistant.

Appendix F

Instructions for Non-deceptive Examinee

Soon after you leave this room today, an examiner will be asking you to take a CVSA examination. He will be asking you a variety of questions on the test. These questions are not personal. Simply answer all the questions truthfully, unless instructed otherwise by the examiner. I would like you to be as cooperative as possible and do your best to follow the examiner's instructions.

Please wait for the research assistant to release you before proceeding.

1. Go from here to room E106.
2. Take the 3" x 5" card on the table.
3. Follow the instructions on the card pertaining to examination room assignment.
4. When the examination is over, bring the 3" x 5" card back to the LIBRARY and wait for the research assistant.

Appendix G

CVSA Pre-Test Interview

Good morning (afternoon), my name is _____ and I will be conducting the computer voice stress examination today. I have been trained and certified in the use of the Computer Voice Stress Analyzer and have been detailed to assist in this very important research project. You and I know that this project is very important otherwise the Army would not have provided us to participate.

Before we begin conducting any examinations we will have discussed a little bit about your background and one of the theories of psychophysiological detection of deception. Let me assure you that nothing will be said or done here that will in any way hurt or injure you. Do you have any questions before we proceed?

Now, I would like to review the interview work sheet.
(Review Pre-Test Questionnaire - Appendix C)

One of the theories concerning the psychophysiological detection of deception or the ability of a trained CVSA examiner to diagnose deception is that of Fight or Flight which you may be familiar with from sports and your training in the military. This phenomenon is theorized to be what allows us to survive in dangerous or stressful situations. When the mind recognizes that we are in danger we enter into Fight or Flight and the naturally occurring substance epinephrine is released into the blood stream. Epinephrine effects different organs of the body in different ways.

The body experiences numerous physiological changes to include changes in heart rate, in the sweat gland activity and the electrodermal activity at the skin. Normally these reactions are associated with fear. These reactions are what allows us to survive in stressful situations such as combat, parachuting, and other duties by providing the brain and certain muscles with additional blood and oxygen, and by removing carbon dioxide from the system.

(The Examinee is then asked to provide an example of when they might have experienced this phenomenon. Common examples were as follows: 1st traffic citation; traffic accidents.)

Well, I can tell by your example that you are familiar with these reactions. The same type of reactions occur when we are practicing deception because there is a fear of being caught in an untruthful statement or being punished for the untruth. Have you ever experienced these reactions?

It is also believed that this Fight or Flight response can affect certain aspects of our speech patterns that cannot be detected by the unaided ear. Special equipment has been designed and built that is able to detect and analyze those patterns. Today we will use an instrument

designed for this purpose to determine whether you are being less than truthful during a voice stress examination.

Review questions to be asked on examination (Appendix H) with the subject.

Appendix H

CVSA Relevant Test Questions (MZOC)

- IR 1.
- C 2.
- IR 3.
- R 4. Do you know who took that \$100 bill from that metal box?
- IR 5.
- R 6. Did you take that \$100 bill from that metal box?
- IR 7.
- C 8.
- IR 9.
- R 10. Do you suspect anyone of taking that \$100 bill from the metal box?
- IR 11.
- R 12. Do you know who took that \$100 bill from that metal box?
- IR 13.
- R 14. Did you take that \$100 bill from that metal box?
- IR 15.

Examples of control and irrelevant questions may be found in the NITV Certified Examiners Course Manual, 1995.

Appendix I

Participant Debriefing Statement

Subject# _____

Now that you have completed your role in our research, it is the desire of the entire project staff to take this opportunity to sincerely thank you for your help. Your work here may be more important than you realize.

If you participated in trying to deceive the CVSA examiner, you are assured by the staff of this Institute, that you in no way violated any rule or law. The deception was required for investigational purposes only. However, those who were told to be deceptive really lied to the examiner.

For those of you who were not involved in a scenario, your role was just as important because a CVSA examination is useless if it cannot identify the truthful person as well as a lying person.

Regardless of your role, it is our hope that nobody involved in this study has made you uncomfortable in any way. Regardless of the role you played, it is our hope that you were made to feel as comfortable as possible throughout the study. If you do have concerns or questions regarding your participation, please make them known to the principal investigator, Dr. Michael J. Janniro and / or the Director, DoDPI, Dr. William Yankee [Telephone number: (205) 848-3803].

Finally, it is VERY IMPORTANT that you DO NOT discuss the details of this study with anyone else. One of your friends, or a friend of a friend, may decide to participate in this or a similar study someday. If they know the details of the investigation process, they could be disqualified from participating in a study and/or unconsciously influence the results of the study using their GUILTY KNOWLEDGE. Please sign this form in the space provided to indicate that you understand the instructions provided above.

Participant Signature

Printed Name

Date